

## Quarterly Progress Report #15

For the project entitled:

### Field Evaluation of the Performance of Three Concrete Bridge Decks on Montana Route 243

*Reporting Period: July 1, 2005 – September 30, 2005*  
*(Quarter 1, State Fiscal Year 2006)*

#### Summary of Expenditures

The table below summarizes the expenditures on this project through September 30, 2005. Expenditures during this quarter were \$14,062.55, with total expenditures through September 30, 2005 equaling \$304,395.07.

Budget Category	Spent through 6/30/05	Spent This Quarter	Total Spent
Salaries	\$127,845.10	\$6,763.76	\$134,608.86
Benefits	\$22,939.83	\$1,737.18	\$24,677.01
In-State Travel	\$16,433.28	\$1,946.92	\$18,380.20
Expendable Supplies	\$17,657.40	\$344.03	\$18,001.43
Tuition	\$13,348.50		\$13,348.50
Reporting	\$0.00		\$0.00
MDT Direct Costs	\$198,224.11	\$10,791.89	\$209,016.00
Overhead	\$35,220.71	\$2,158.36	\$37,379.07
MDT Share	\$233,444.82	\$12,950.25	\$246,395.07
CE Share	\$8,887.70	\$1,112.30	\$10,000.00
WTI Share (Equipment and Out- of-State Travel)	\$48,000.00	\$0.00	\$48,000.00
<b>Total</b>	<b>\$290,332.52</b>	<b>\$14,062.55</b>	<b>\$304,395.07</b>

**Task A: Project Management**

Work in this area focused on regularly downloading long-term strain data from the bridges, maintaining the data acquisition equipment and associated software, conducting the second set of live load tests, and comparing the results of all work accomplished on this project to be included in the final report.

**Task B: Conduct Literature Review**

The primary literature review for this project has been completed. Relevant literature collected throughout the project will be summarized in the final report.

Action Items for next quarter:

- Summarize literature review in final report

**Task C: Develop Instrumentation Plan and Assemble Data Acquisition System****Determine Gage Locations**

All proposed work has been accomplished for this task, and no additional work is anticipated. Past accomplishments for this task are summarized in the interim project report and will be included in the final report.

**Weather Station**

The remote weather station continues to function well, collecting pertinent weather information every 15 minutes and automatically downloading it to a central, searchable database.

The remodeling work in the main office at the Saco Public Schools is complete. The data acquisition hardware associated with the weather station and communication equipment remained in place, but was down intermittently during remodeling.

**Bridge Monitoring Data Acquisition System**

The long term monitoring equipment functioned properly during this quarter.

Action Items for Next Quarter:

- Continue to preserve and maintain the long-term monitoring system

**Task D: Install Instrumentation and Compile As-Built Documentation****Instrumentation Installation**

All proposed work has been accomplished for this task, and no additional work is anticipated. Past accomplishments for this task are summarized in the interim project report (July 2004). A summary of this will also be included in the final report for the project.

### **Materials Testing**

The properties of all the materials used to construct the three Saco bridge decks were summarized and included in the interim report. The material properties reported in the interim report indicate the strength of the deck concretes approximately one month after they were cast. Additional concrete test specimens (compression cylinders and rupture beams) that were stored at the bridge site for the past two years were tested at Montana State University this quarter to determine the strength of the deck concrete coincident with the second live load tests. Final measurements were also made on the shrinkage beams. Results from these tests will be summarized in the final report.

### **Task E: Live Load Testing**

The second (and final) set of live load tests were conducted during the week of July 18<sup>th</sup>, 2005. WTI coordinated with MDT in Malta to schedule the test trucks and the traffic control. Data collected during these tests is currently being analyzed and will be summarized in the final report.

### **Task F: Long-Term Monitoring**

#### **Strain Monitoring**

Approximately 28 months of long-term data has been collected from selected sensors in each of the bridge decks. All the active long term sensors continue to provide measurements once every hour. The long-term strain data is currently being analyzed to determine temperature related effects on the performance of each of the bridge decks. This analysis will use 24 months of data (between July 2003 and July 2005). The results of the analysis will be summarized in the final report.

#### **Action Items for Next Quarter:**

- Continue long-term monitoring of strain and temperature in the bridge decks

#### **Large Vehicle Event Monitoring**

The data loggers continued to monitor large vehicle events throughout this quarter.

#### **Action Items for Next Quarter:**

- Continue collecting large vehicle event data

#### **Corrosion Testing**

The latest carbonation and half-cell tests were conducted when WTI researchers visited the Saco bridges in July 2005, during the second live load tests. The results from these tests will be summarized in the final report.

**Crack Mapping**

WTI conducted an extensive crack survey of the bridge decks during the live load tests in July. The results from these surveys will be summarized in the final report.

**Deck Survey**

WTI conducted the final geographic survey of the deck surfaces while in Saco for the live load tests in July. Data from these surveys will be analyzed to reveal any significant movements of the structure due to settling, etc.

**Task G: Analysis**

A comprehensive analysis of all data collected through the second live load test is underway. Data will be analyzed to identify differences in performance between the three deck types. Long term strain data and the second live load test data will be studied and summarized in the final report next quarter.

**Action Items for Next Quarter:**

- Continue to organize and analyze long-term and live load strain data
- Synthesize data and compose conclusions for final report

**Task H: Project Reporting**

The final report for this project was begun and will be completed next quarter. A paper summarizing the accomplishments and preliminary results of the Saco Bridge project was written and submitted to the Transportation Research Board's annual meeting in Washington D.C., January 2006.

**Action Items for Next Quarter:**

- Submit draft final report, address comments, and complete the final report for the project
- Present findings before the technical panel at MDT